

LJUNGHIA OUDEMANS (ACARI: DERMANYSSIDAE), A GENUS PARASITIC ON MYGALOMORPH SPIDERS

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ABSTRACT

DOMROW, R. 1974. *Ljunghia* Oudemans (Acari: Dermanyssidae), a genus parasitic on mygalomorph spiders. *Rec. S. Aust. Mus.* 17 (14): 31-39.

A key, illustrations, and descriptive notes are given for the four laelapine species now known in *Ljunghia* Oudemans (Dermanyssidae). At least three are parasites of mygalomorph spiders, as follows: *L. selenocosmia* Oudemans from *Selenocosmia* (Theraphosidae) in Sumatra; *L. hoggi* sp. n. from *Aganippe* (Ctenizidae) in South Australia; *L. pulleini* Womersley from *Selenocosmia* and *Aname* (Dipluridae) in South Australia, and an unidentified diplurid in Queensland; and *L. rainbowi* sp. n. from an unidentified spider in South Australia

INTRODUCTION

This paper revises the two known species of the genus *Ljunghia* (family Dermanyssidae *sensu* Evans and Till, 1966) to the extent that the original descriptions need expansion, and details two new species. The following key will quickly show that the setational patterns vary considerably from species to species, but an otherwise uniform *facies* and the ecological data indicate only a single genus is involved (see Hunter and Husband, 1973).

The setae on the dorsal shield are equated with the standard pattern given for *Haemolaelaps* Berlese by Costa (1961, as amended by Lindquist and Evans, 1965). The patterns on the capitulum and legs are compared with those of free-living dermanyssids (Evans and Till, 1965, as amended by Evans, 1969), except for the larvae, whose legs are detailed after Evans (1963). The less reduced species of *Ljunghia* show relatively constant formulae, but the regular presence or absence of one or even two setae in the more reduced species is to be expected.

Genus LJUNGHIA Oudemans

Ljunghia Oudemans, 1932, p. 204. Type-species: *Ljunghia selenocosmia* Oudemans, 1932, by monotypy.

DIAGNOSIS. From Evans and Till's keys (1966) to dermanyssid taxa, *Ljunghia* is clearly a laelapine genus related to the *Hypoaspis* Canestrini complex. The latter also includes many

associates of arthropods, but the generally holotrichous condition of the dorsal shield (at least 37 pairs of setae) will distinguish *Hypoaspis*, however unclear its internal relationships may be from the markedly holotrichous *Ljunghia* (at most 32 pairs of setae).

Frankly, it is difficult to delimit a genus in such a little known subfamily, yet a diagnosis so extended to include the widely varying setal formulae on the dorsal shield and legs may well exclude species as yet undescribed (Costa, 1971). Accordingly, I assign to *Ljunghia* those species with the following characteristics:

Chelicerae chelate-dentate in female; fixed digit reduced (except in *L. selenocosmia*), but always with at least trace of pilus dentilis. Chelicerae normally formed in male, with spermatophore-carrier slightly exceeding tip of movable digit. Dorsal shield entire, markedly hypotrichous. Metasternal setae absent (except in *L. selenocosmia*). Only genital setae set on genital shield (except in *L. rainbowi*). Anal shield elongate, with characteristic anteromedial extension. Leg setation holotrichous to markedly hypotrichous. Parasites of spiders, especially mygalomorphs, in the Oriental-Australian Region.

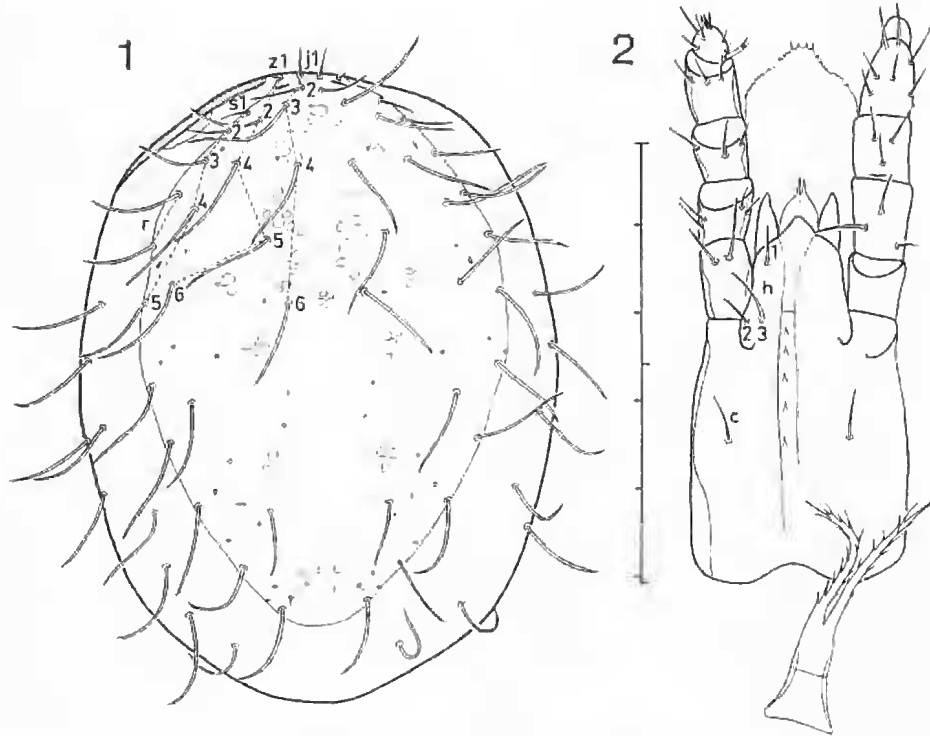
KEY TO SPECIES OF LJUNGHIA

(Adults only; male of *L. rainbowi* unknown)

1. (0) Dorsal shield with 32 (21 podonotal and 11 opisthonotal) pairs of setae. Metasternal setae present. Ventral setae numerous. No leg segment has less setae than typical free-living dermanyssids. Cheliceral digits of female subequal
selenocosmiae
Dorsal shield with 25 pairs of setae at most. Metasternal setae absent. Only eight pairs of ventral setae. At least one leg segment has less setae than typical free-living dermanyssids. Fixed cheliceral digit of female only half as long as movable digit 2
2. (1) Dorsal shield with 25 (17 + 8) pairs of setae. Palpal trochanter-tibia with normal setation (2.5.6.14). Only one leg segment (femur I) with deficient setation *hoggi*
Dorsal shield with less than 25 pairs of setae. Palpal trochanter-tibia with reduced setation. At least three leg segments (excluding genu IV) with deficient setation 3

3. (2) Dorsal shield with 18 (15 + 3) pairs of setae. Genital setae on genital shield. Deutosternal denticles single. Palpal trochanter-tibia with 2.5.6.11 setae. Seven leg segments with deficient setation (see text) *pulleini*

Dorsal shield with 15 (11 + 4) pairs of setae. Genital setae off genital shield. Deutosternal denticles multiple. Palpal trochanter-tibia with 2.5.5.14 setae. Three leg segments with deficient setation (see text) *rainbowi*



FIGS. 1-2. LJUNGHIA OUDEMANS

1. *L. hoggi* sp. n., female, dorsum of idiosoma. 2. *L. pulleini* Womersley, female, venter of capitulum (with inset of epistome and true left palp shown dorsally). (Each division on the scales = 100 μ .)

Ljunghia selenocosmiae Oudemans

Ljunghia selenocosmiae Oudemans, 1932, p. 204.

FEMALE. Capitulum inconveniently, but variously, disposed in available specimens, and many details visible. Setae rather longer than in other species, *c* reaching well beyond sides of basis. Deutosternal groove broad, with multiple denticles (number of rows uncertain). On hypostome, $h3 > h2 > h1$, with $h3$ subequal to *c*. Hypostomatal processes not clear. Epistome triangular, intermediate in length between those of *L. pulleini* and *L. rainbowi*; denticulate. Palpal trochanter-genu with normal setation (2.5.6); tibia and tarsus not clear, but former probably 14; claw bifid. Chelicera as figured by Oudemans; pore undetected.

Dorsal shield 735-755 μ m long, 495-525 μ m at maximum width; with 32 pairs of setae comprising 21 pairs of podonotals (only ± 3 missing) and 11 pairs of opisthonotals. (The observant will note that Oudemans, well aware

of minor individual variation, tacitly shows only 31 setae on the right-hand side of his drawing.)

Tritosternum as in *L. rainbowi*. Deeply eroded, but retilinear posterior margin of sternal shield confirmed. One ventral seta occasionally usurped by tip of genital shield. Small metapodal shields present. Peritremes reaching forward almost to vertex, but peristigmatic details not clear.

Legs also difficult to examine, but many setae considerably longer than shown by Oudemans. Formulae normal except for tibia I, which shows one additional *v* (2-6/4-2). Tarsus I, including distal sensory plaque, not dissimilar to that of other species. Claws rather larger than in *L. pulleini*.

MALE and DEUTONYMPH. See Oudemans. Dorsal shield 660 μ m long, 440 μ m at maximum width. Chelicera of male in normal (dorsoventral) aspect in both specimens, but not dissimilar to Oudemans' Fig. 26.

PROTONYMPH and LARVA. Not seen.

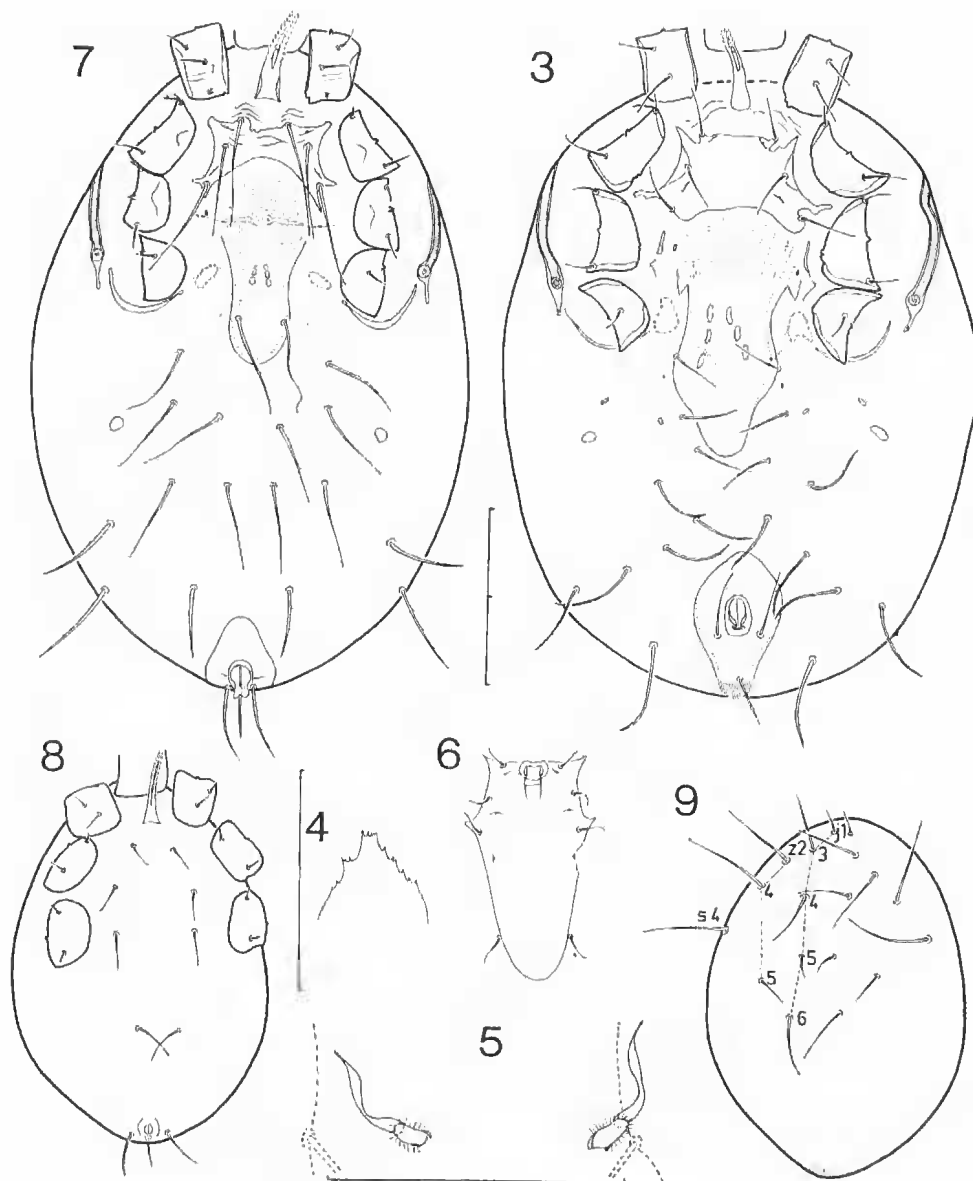
LOCALITY. Twelve females, two males, and six deutonymphs from the type series, *Selenocosmia javanensis* (Walckenaer) (Theraphosidae), Deli, Sumatra, 3.1931, col. J. C. van der Meer Mohr, dep. RMNH. I designate one female as lectotype.

Ljunghia hoggi sp. n.

FEMALE. Capitulum with *c* setae only slightly exceeding sides of basis. Deutosternal groove as in *L. rainbowi*, with seven or eight rows of multiple denticles. Hypostome with $h3 > h1 > h2$; only lattermost shorter than *c*.

Hypostomatal processes as in *L. pulleini*. Cornicles as in *L. rainbowi*. Epistome as long as that of *L. selenocosmiae*, but more strongly denticulate. Palpi with normal setation on trochanter-tibia; tarsus not clear; claw bifid. Chelicera as in *L. rainbowi*.

Dorsal shield with outline intermediate between those of *L. selenocosmiae* and *L. pulleini*; 635-690 μm long, 415-440 μm at maximum width. Podonotal half with seventeen pairs of setae: *j*1-4, 6, *z*1, 2, 4-6, *s*1-5, and 2*r*. Opisthonotal half with eight pairs of setae (seven long, one short). Cuticle with about eight pairs of setae, the most anterior pair of which may represent extrascutal *s*6.



FIGS. 3-9. *LJUNGHIA* OUDEMANS

3-6. *L. hoggi* sp. n., female: 3. venter of idiosoma; 4. epistome; 5. spermathecae; male: 6. sternogenital shield. 7-9. *L. pulleini* Womersley, female: 7. venter of idiosoma; larva: 8-9. venter and dorsum of idiosoma.

Sternal shield more conventionally shaped than in other species, but still weak and eroded. With three pairs of subequal setae rather longer than interval between them. Venter otherwise as in *L. rainbowi*, except that genital setae are on genital shield and poststigmatic portion of peritrematal shields is fuller.

Legs with normal setation except for femur I, which is unidifferent ventrally (2-5/3-2). Femora lacking outstandingly long setae dorsally. Tarsus I essentially as in *L. pulleini*, but claws rather stronger than in that species.

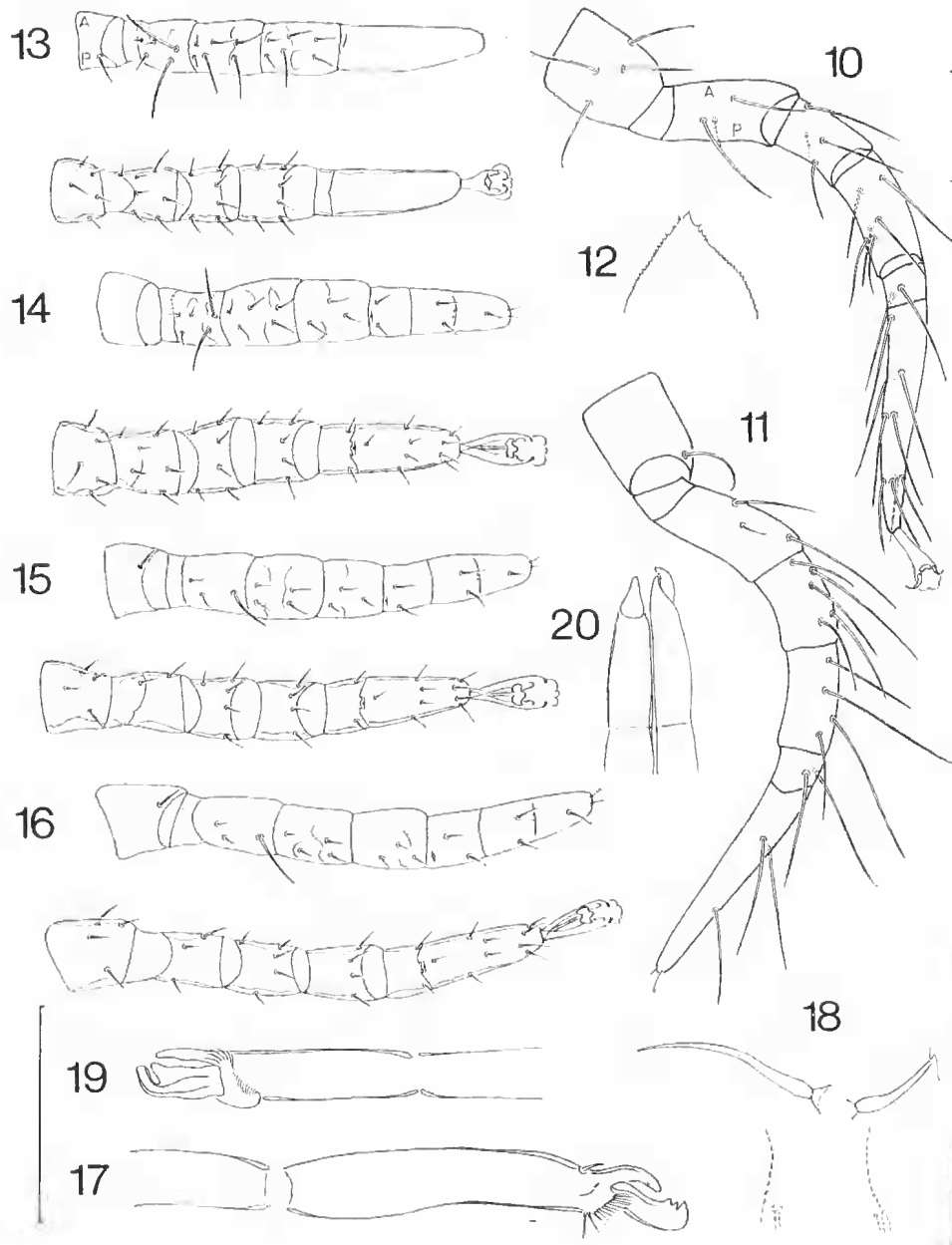
MALE. Capitulum as in female, except for chelicera, which is similar to that of *L. pulleini*.

Dorsum as in female. Dorsal shield 555 μm long, 325 μm at maximum width.

Venter as in female, except for sternogenital shield, which is similar to that of *L. pulleini*.

Legs as in female.

IMMATURES. Unknown.



FIGS. 10-20. *LJUNGGHIA* OUDEMANS

10-12. *L. selenocosmia* Oudemans, female: 10-11. venter and dorsum of leg IV; 12. epistome. 13-20. *L. pulleini* Womersley, female: 13-16. dorsum and venter of legs I-IV; 17. exterior of chelicera; 18. spermathecae; male: 19. ventro-interior of chelicera; larva: 20. venter and dorsum of chelicerae.

LOCALITY. Holotype female, three paratype females, and two morphotype deutonymphs from *Aganippe subtristis* Pickard-Cambridge (Ctenizidae). Seacliff, Adelaide, South Australia, 11.1973, col. R. Coulter, dep. SAM.

Two females and one male from *A. subtristis*, Peterborough, South Australia, 4.3.1967, col. L. Wright, dep. SAM. Not types.

Ljunghia pulleini Womersley

Ljunghia pulleini Womersley, 1956, p. 591.

FEMALE. Capitulum with *c* setae barely reaching sides of basis. Deutosternal groove narrow and difficult to examine posteriorly, but denticles single and at least five in number. Hypostome with three pairs of *h* setae (*h3* strongest), and moderately sclerotized cornicles in addition to distal processes. Epistome rounded, denticulate, not exceeding distal margin of trochanter. Palpal trochanter-genu with normal setation, but femur occasionally lacking one *d*, or with one (more rarely two, as figured) additional *v* seta; genu occasionally lacking one *d* seta. Tibial setation considerably reduced, comprising eight (seven to nine) *d*, and three (occasionally two) *v*, setae, including dorsodistal rods. Tarsus shown diagrammatically; claw bifid. Chelicera unreduced except for fixed digit, which shows merest indication of pilus dentilis.

Dorsal shield 505-605 μm long 285-340 μm at greatest width. Podonotal half with fifteen pairs of setae: *j1-6*, *z1-2*, 4-6, and *s1-4* (*z3* always absent, one *z1* occasionally absent, and *s1-2* often represented only by single pair). First six pairs of setae on cuticle constant in number and position, and possibly representing extrasutural *s5-6* (two long pairs) and *r2-5* (four short pairs), thereby accounting for full complement of 22 podonotal pairs. Opisthonotal half of shield typically with three pairs of setae (two long and one short), but minor variation common. Thus although terminal pair is always present, one or both of other long pair, or one of short pair, may be lacking. Because of extreme reduction from normal seventeen pairs on opisthonotal half of shield, these setae are not assigned. Of seven or eight additional pairs of setae on cuticle, at least the long pair may be extracuticular.

Metasternal complex absent except for pores (normally free in cuticle, but rarely on extension of sternal shield; Womersley writes "shields" in error for "setae" on p. 593). Genital setae on

shield, but attendant pores free in cuticle. Ventral setae in eight pairs, but not easily reconciled with pattern in other two Australian species (2.2.4.6.2). Peritrematal shields extended narrowly behind stigmata, and more broadly on dorsal margin near end of peritreme.

Coxa II with minute process on anterodorsal margin. Setation normal for following leg segments: all coxae and trochanters, femora II and IV, genua II-III, and tarsi II-IV. One seta lacking on femur I (2-5/3-2), femur III (1-3/1-0), genu I (2-6/2-2), tibia I (2-6/2-2), and tibia III (1-3/2-1). Two setae lacking on tibia II (2-3/2-1). Three setae lacking on tibia IV (1-3/2-1). Genu IV with full complement only because additional *v* makes up for absent *d*. Femora with 2.2.1.1 *d* setae distinctly longer than remainder. Tarsus I with sensory plaque distal.

MALE. Setal patterns as in female. Setule and pore on chelicerae not detected.

DEUTONYMPH. Capitulum as in female.

Dorsum as in female, but shield smaller (360-440 μm long, 210-255 μm at maximum width).

Venter as in female except for sternoprogenital shield. This bears usual three pairs each of setae and pores along eroded margin; pregenital setae free in cuticle. Development of peritrematal shields minimal.

Legs, including tarsus I, with same setal formulae as female.

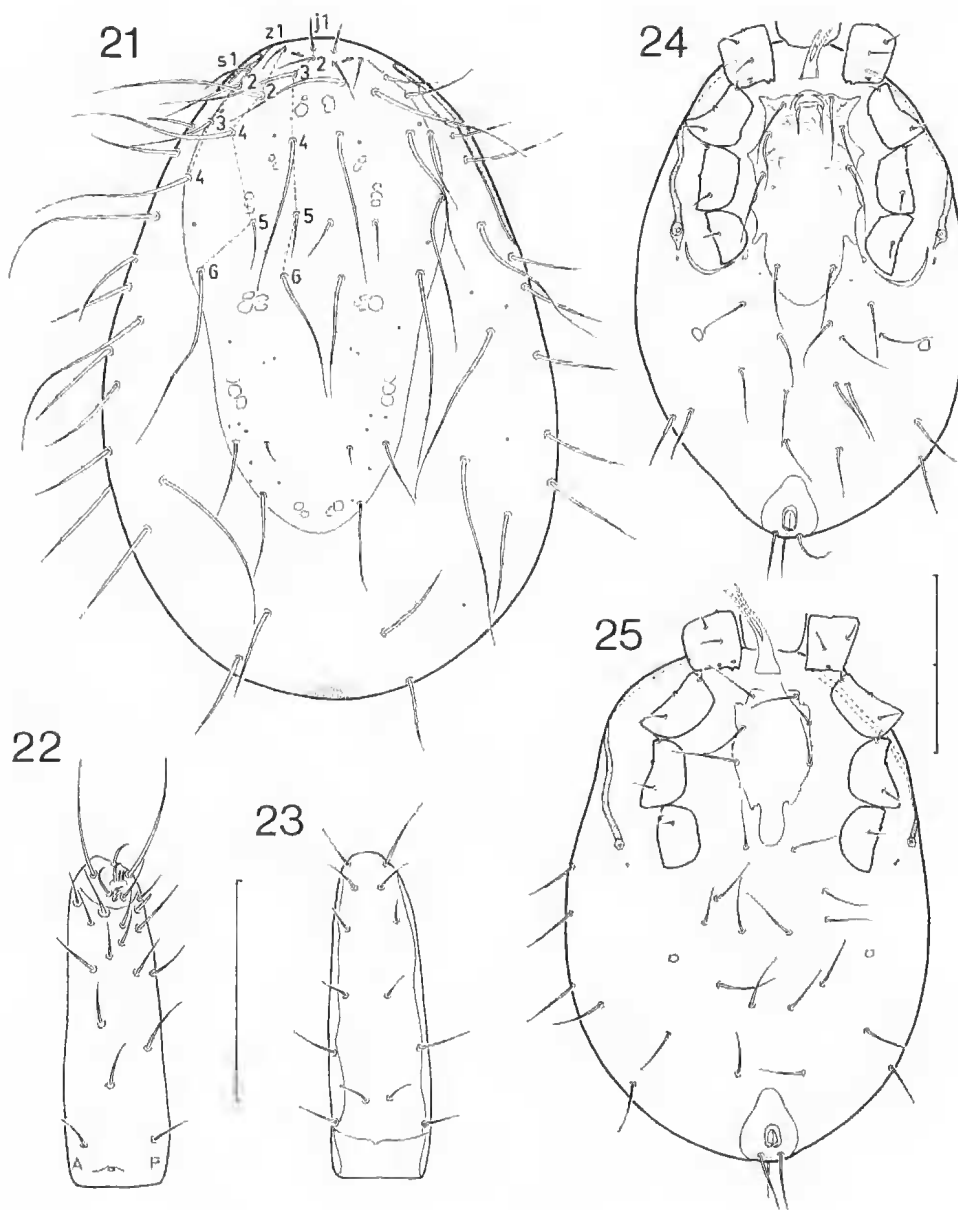
PROTONYMPH. Unknown.

LARVA. Hypostome lacking setal hair *h3*. Palpal setal formula for trochanter-genu normal, but tibia as in adult (i.e., with eleven setae). Chelicera presaging that of adult female.

Idiosoma 425-450 μm long, 310-340 μm at greatest width. Dorsum without shield, but with normal nine pairs of setae: *j1*, 3-6, *z2*, 4-5, and *s4*. These are readily equated with adult pairs of similar position and strength.

Venter without shields, but with three pairs of sternal, one pair of ventral, and three anal setae (postanal shortest as in adult). Stigmatic apparatus absent.

Legs with normal setal patterns, femur II being as in Evans (1963, Fig. 2b). Setae *ad1* and *pd1* on tarsi II-III not detected.



FIGS. 21-25. *LJUNGHIA PULLEINI* WOMERSLEY

21-23. Female: 21. dorsum of idiosoma; 22-23. dorsum and venter of tarsus I;
24. male: venter of idiosoma; 25. deutonymph: venter of idiosoma.

LOCALITY. Six females from the type series, *Selenocosmia stirlingi* Hogg (Theraphosidae), Orroroo, near Peterborough, South Australia, 5.1933, col. H. Gray, dep. SAM. Despite Womersley's statement, the present curator, Mr. D. C. Lee, tells me (*in litt.*, 9.8.1973) that no specimen bears a holotype label, and I therefore designate one female as lectotype.

Four females and two males from *Aname* sp. (Dipluridae), Strathalbyn, east of Mount Lofty Range, South Australia, 8.12.1971, col. I. Buring, dep. SAM.

Sixteen females, eighteen males, fourteen deutonymphs, two larvae (plus several specimens

still in spirit) from an unidentified spider QM W3856 (Dipluridae), Rifle Range, Chinchilla, Queensland, 10.9.1972, col. R. J. McKay, dep. QM.

REMARKS. The description and figures now given apply to the series from Queensland. The type specimens all show three pairs of setae on the opisthotal half of the dorsal shield. Generally speaking, their body setae are relatively longer, e.g., *j*5 and especially *z*5 exceed the bases of *j*6 and *z*6. Their leg setal formulae differ only on tibia II (commonly 2-4/2-1, occasionally standard 2-4/2-2) and genu III (commonly 2-4/2-2, occasionally standard 2-4/2-1).

The specimens from *Aname* all lack the subterminal pair of long setae on the dorsal shield. Generally speaking, their body setae are relatively shorter, e.g., *j6* is hardly longer than *j5* and *z5*. Their legs are not suitably arranged for detailed examination.

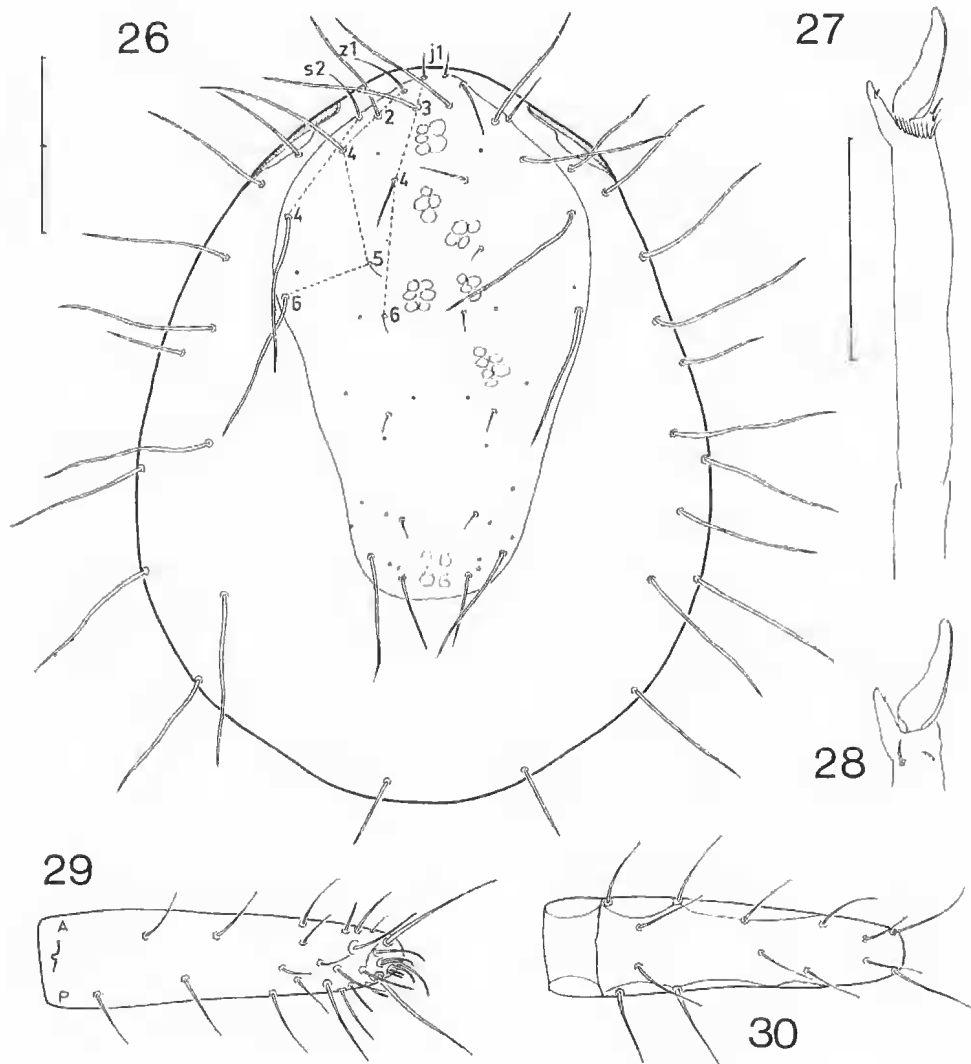
All three series, however, key out together and are clearly conspecific.

***Ljunghia rainbowi* sp. n.**

FEMALE. Capitulum with *c* setae reaching beyond sides of basis. Deutosternal groove more distinct than in *L. pulleini*, with nine rows of multiple denticles. Hypostome with setae *h1* and 3 subequal to *c*, and longer than *h2*; hypostomatal processes as in *L. pulleini*. Cornicles with incipient cleft distally. Epistome an elongate triangle, weakly denticulate, reaching to mid-

femur. Palpi with normal setation on trochanter-tibia, except for unidifferentiated genu (*al1*, *pl*, 3 *d*). Tarsus shown diagrammatically; claw bifid. Chelicera similar to those of *L. pulleini*, but small pilus dentilis present and movable digit almost edentate.

Idiosoma capable of considerable distension because of weakness of shields. Dorsal shield shaped as in *L. pulleini*, 585-615 μm long, 340-365 μm at maximum width. Podonotal half with eleven pairs of setae: *j1*, 3-4, 6, *z1-2*, 4-6, and *s2*, 4. Opisthonotal half with four pairs of setae (two short discals and two long subterminals). Because of strong reduction of setal formulae on dorsal shield, it is idle to assign ten or eleven pairs of setae free on cuticle. Nevertheless, constant position and relative lengths of at least first five pairs suggest they are extra-scutal members of *s* and *r* series. More posterior



FIGS. 26-30. *LJUNGHIA RAINBOWI* sp. n.

26-30. Female: 26. dorsum of idiosoma; 27-28. ventrointerior and dorsoexterior of chelicera; 29-30. dorsum and venter of tarsus I.

pairs less regular in position, but always long except for terminal pair. Pattern of pores and muscle insertions on shield difficult to discern because of granular inclusions; accordingly, while those shown are correct, more may exist.

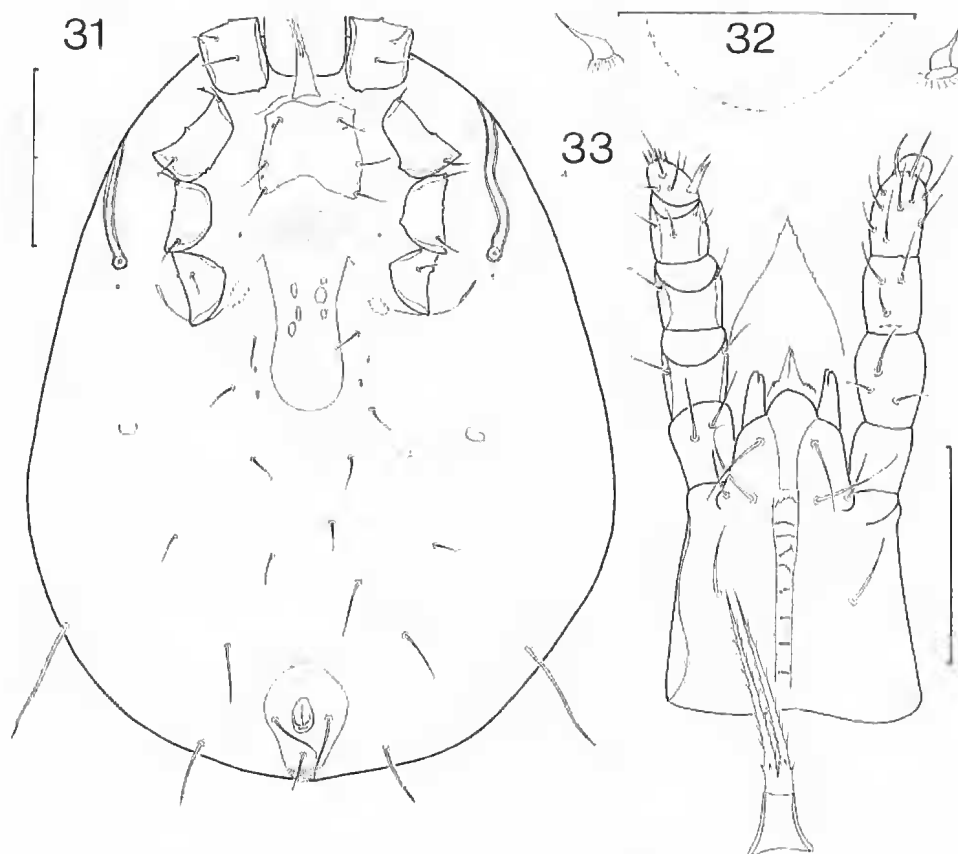
Tritosternum with well developed base, but laciniae rather short, slenderly tapering, and weakly ciliated. Sternal shield less conventionally shaped than in other Australian species; pale and unreticulated, with anterolateral margins extremely weak and posterior margin eroded. Sternal setae short and subequal, at most only slightly longer than interval between them; sternal pores present but weak, particularly posterior pair. Metasternal complex represented only by pore. Genital shield reduced and without striae, but with normal muscle insertions and operculum supported by apodemes between coxae IV. Genital setae and pores free in cuticle. Margin of anal shield only slightly extended anteriorly; adanal setae set near centre of anus, rather longer than postanal; cribrum present. Small metapodal shields present. Crescentic exopodal shields IV present but weak. Ventral

setae in eight pairs arranged as in *L. hoggi*; of increasing length posteriorly, one posterolateral pair being quite strong. Stigmatic apparatus as in *L. pulleini*, but poststigmatic development minimal.

Legs largely as in *L. pulleini*, with same segments showing normal dermanyssid setation, except for trochanter I (1-0/3-1). Of eight segments modified in *L. pulleini* (Queensland specimens), four retain normal dermanyssid setation (femur III and tibiae II-IV); of remaining four, femur-tibia I are as in *L. pulleini*, while genu IV is normal dorsally, but bears an additional *v* (2-5/2-1). All femora with one *d* distinctly longer than remainder. Tarsus I as in *L. pulleini* except for minute details. Ambulacra as in *L. pulleini*.

MALE AND IMMATURES. Unknown.

LOCALITY. Holotype female and three paratype females from an unidentified spider, Long Gully, South Australia, 11.6.1938, col. H. Womersley, dep. SAM.



FIGS. 31-33. *LJUNGHIA RAINBOWI* sp. n.

31-33. Female: 31. venter of idiosoma; 32. spermathecae; 33. venter of capitulum (with inset of epistome and true left palp shown dorsally).

NOMENCLATURE

Although Womersley (1956) coined his specific name explicitly in honour of R. H. Pulleine, his consistent *pulleini* is in literal accord with Rec. 31A, and is retained as the correct original spelling (Art. 32). Following Womersley's lead, the two new species above are also named after early students of Australian spiders: H. R. Hogg and W. J. Rainbow.

ACKNOWLEDGMENTS

I am grateful to Mr. D. C. Lee, South Australian Museum, Adelaide, for material from Womersley's series and the two new species; to Dr. L. van der Hammen, Rijksmuseum van natuurlijke Historie, Leiden, for slides from the Oudemans collection; to Dr. D. H. Kemp, C.S.I.R.O., Indooroopilly, for specimens from the diplurid with Queensland Museum, Brisbane, labels; and to Miss Leanne Jackson for technical assistance.

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